

Some classification results on lattice polytopes

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Lattice polytopes, that is, polytopes with vertices in the integer lattice, play a significant role in mathematics. In algebraic geometry they arise as Newton polytopes and have very close connections with toric geometry. In optimization they represent cases where integer programming (hard in general) collapses to linear programming (fast, polynomial).

We have recently been interested in classification results about hollow lattice polytopes, that is, lattice polytopes with no interior lattice points. In particular, we have completed the classification of 4-dimensional empty lattice simplices, which are related to the terminal singularities that appear in the minimal model program. Our classification finishes a task started by Mori et al. in 1989 and allowed us to answer a question of Cauley and Birkar.